Dec. 10, 1963 E. L. VERHAGEN 3,113,853

AIR CHECK VALVES

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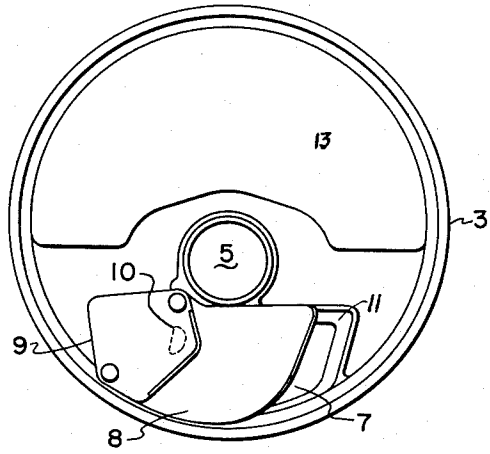


Fig. 2

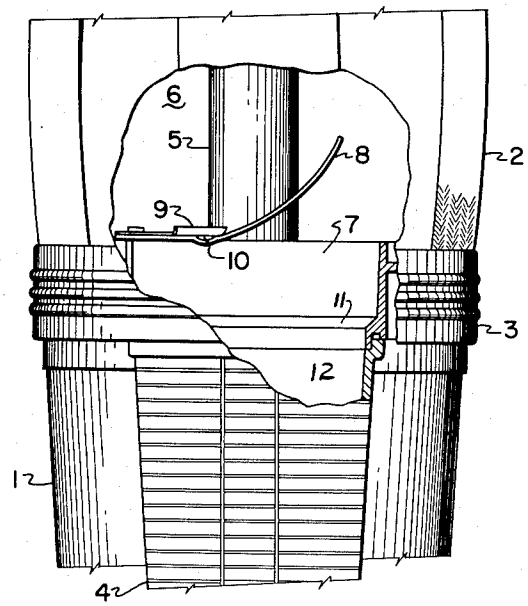


Fig. 1

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AIR CHECK VALVES

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1 Claim. (Cl. 55—367)

This invention relates to an improvement in air check valves of the type employed in vacuum cleaners.

One object of the invention is to provide a vibrating check valve between the fan chamber of a vacuum cleaner and the filter bag that not only seals off the fan exhaust opening when the fan stops but improves the nozzle pick up while the fan is rotating.

A further object is to provide means for keeping the inner surfaces of the filter bag free of clinging dirt, lint and dust.

Still another object is to provide an economical check valve for the first named objectives.

Other objects will appear from the description which follows.

In the drawings in which the same reference numeral refers to the same or a similar part, there are shown those portions of an upright type of vacuum cleaner in which the invention is incorporated. While the invention is not limited to use with the upright type of vacuum cleaners, its greatest value is secured with such use.

FIGURE 1 is an elevational view of that portion of an upright type vacuum cleaner where the fan exhaust is connected with the bottom of the filter bag and shows the check valve in side elevation, in open position.

FIGURE 2 is a top view of the base to which the open lower end of the filter bag is secured and shows a top view of the check valve in the position in which it is shown in FIGURE 1.

Referring to FIGURE 1, filter bag 2 is secured along its bottom edge to circular base plate 3 within its upstanding wall portion located on the periphery of base plate 3. Attached below base plate 3 is removable dirt cup 1 and fan exhaust conduit 4 having passage 12 of substantially rectangular cross section within it. Opening 7 in base plate 3, with taper 11, is in registry with passage 12.

Metal shaft 5 is the principal structural member of the vacuum cleaner after passing through base plate 3 and interior 6 of bag 2, emerges at the top to form a handle for the cleaner.

Referring to FIGURE 2, base plate 3, through which shaft 5 passes, has two openings in its surface, intake opening 7 and dirt discharge opening 13. When assembled in the cleaner, opening 7 is over passage 12 and opening 13 is over the open top of dirt cup 1. Opening 7 is closable by the improved check valve which consists of flexible flat member 8 secured to base plate 3 by a clamping plate 9.

As best seen in FIGURE 1, a depression 10 in clamping plate 9 causes member 8 to be depressed in that area.

The operation of the check valve shown is as follows. When the vacuum cleaner motor is turned on, the fan sucks up air and dirt through the nozzle, and discharges the air borne dirt through passage 12 and opening 7 into filter bag 2.

Flexible member 8 is held by the air current in open position but a fluttering action takes place as the velocity of the air varies in passing through opening 7. Such variation in velocity occurs even when the nozzle is not in contact with a floor or other surface and is completely unobstructed. Additional fluctuation in velocity is a natural result that arises when the nozzle is placed in varying contact with a surface to be cleaned. The position of clamping plate 9, and location and size of depression 10 determine the degree of vibration or flutter.

The result of the fluttering check valve is to produce vibratory action upon the bag and discourages dust and lint from clinging to the inner surface of the bag. In addition, improved pick-up is secured due to the vibratory action produced on the fabric being cleaned which loosens imbedded dust particles.

Thus not only is the conventional object of a check valve achieved, that of preventing dirt from falling back into the fan chamber and motor when the motor is stopped, but improved pick-up and greater filter efficiency is obtained.

The filter bag permits air to escape through it but retains dirt which falls back, not into the fan chamber but through opening 13 into removable dirt cup 1.

The application of this invention to uses other than an upright type vacuum cleaner is apparent and it is not intended by the specific illustration herein given to thereby limit the scope of this invention.

What I claim is:

A check valve in a vacuum cleaner comprising a fan exhaust conduit opening into the bottom of a filter bag; a flat flexible member normally covering the conduit opening; a flat rigid member overlying a portion of the flexible member adjacent one end thereof and in facing contact therewith, such rigid member permanently secured to and across a portion of the conduit opening; and a protuberance in that surface of the rigid member in contact with the flexible member.

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